

HP VMA SAN Gateway

Installation and Configuration Guide

For release G5.5.1

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Portions of this document are intended solely as an outline of methodologies to be followed during the installation, set-up, and maintenance of HP equipment. It is not intended as a step-by-step guide or a complete set of all necessary and sufficient procedures.

While every effort has been made to ensure that this document is complete and accurate at the time of publication, the information that it contains is subject to change. HP is not responsible for any additions to or alterations of the original document. This document is intended as a general guide only. It has not been tested for all possible applications, and it may not be complete or accurate for some situations.

Users of this document are urged to heed warnings interspersed throughout the document, such as service disruption warnings.

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Preface

This guide describes how to safely install and configure the HP VMA SAN Gateway hardware and software.

This preface covers the following topics:

- [Intended Audience](#) on page 6
- [Document Conventions](#) on page 7
- [Reference Documents](#) on page 8
- [Getting Help](#) on page 8
- [Comments & Questions](#) on page 9

Intended Audience

This guide is intended for experienced network and system administrators. Hewlett-Packard assumes that you are experienced in installing and configuring high-performance storage systems.

Contact Hewlett-Packard Customer Support for any assistance. For contact information, see [Getting Help](#) on page 8.

Document Conventions

This documentation follows the conventions outlined in this section.

Important Information

The following table summarizes the notations used to call out important information, such as warning, caution, and note

Safety Icons

Icon	Sample Text
WARNING!	WARNING! Only authorized, qualified, and trained personnel should attempt to work on this equipment.
Caution:	Caution: Follow the listed safety precautions when working on the HP VMA Array.
Note:	Note: Read through this entire chapter and plan your installation according to your location before installing the equipment. The following procedures and the order in which they appear are general installation guidelines only.

Typographical Conventions

The following typographic conventions are used in this guide:

Format	Meaning
Bold	User Interface text.
<i>Italic</i>	Provides emphasis and identifies variables and document titles.
Courier	Command names, examples, and output.
Courier bold	Input you must type exactly as shown.
< <i>Courier italic</i> >	Information for which you must supply a value.
[]	Optional command parameters are enclosed within square brackets.

Typographical Conventions

Format	Meaning
	Separates a set of command choices from which only one may be chosen.
{ }	Required command parameters that must be specified are enclosed within curly brackets.

Typographical Conventions (*continued*)

Reference Documents

In addition to this guide, the following Hewlett-Packard documents comprise the documentation suite for the HP VMA Array. These guides are available for download from the HP VMA manual site at <http://hp.com/go/vma-docs>

This document...	Provides this information...
Release Notes	Describes the new features, resolved issues, known limitations and software upgrade instructions for the current release.
<i>HP VMA SAN Gateway User's Guide.</i>	Provides instructions for managing, monitoring, and maintaining the HP VMA Array.
<i>HP VMA-series Memory Array Installation and Service Guide</i>	Provides instructions for installing, configuring, and servicing a HP VMA Array.

Reference Documents

Getting Help

Contacting HP

Before you contact HP

Be sure to have the following information available before you contact HP:

- Technical support registration number (if applicable).
- Product serial number
- Product model name and number
- Product identification number
- Applicable error message
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level.

HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, see the HP US service locator webpage (<http://welcome.hp.com/country/us/en/wwcontact.html>).
- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/contact_us.html).

For HP technical support:

- In the United States, for contact options see the Contact HP United States webpage (http://welcome.hp.com/country/us/en/contact_us.html).

To contact HP by phone, call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

If you have purchased a Care Pack (service upgrade), call 1-800-633-3600.

- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/contact_us.html).

Subscription Service

HP recommends that you register your product at the subscriber's Choice for Business website (http://www.hp.com/country/us/en/contact_us.html).

Comments & Questions

HP welcomes your feedback. To make comments and suggestions about product documentation, send a message to docsfeedback@hp.com.

This chapter covers the HP VMA SAN Gateway hardware deployment in the following topics.

- [System Specifications](#) on page 10
- [Planning a Configuration](#) on page 10

System Specifications

Review the system specifications as described in [System Specifications](#) on page 65 to create a deployment plan that meets the requirements for your site.

Planning a Configuration

Use the information in the following sections to define the configuration best suited for your site:

- [Defining a Configuration](#) on page 11
- [System Configuration Examples](#) on page 11

Defining a Configuration

By the time you are ready to install the HP VMA SAN Gateways, the type of configuration to be implemented should have already been decided upon:

- Standalone
- Redundant Gateway pair for High Availability access

If this decision has not yet been reached, review the [System Configuration Examples](#) in this chapter to define the configuration best suited for your site. Then review the and acquire the necessary items.

Note: For high availability access using redundant gateway pair, follow the planning instructions in the Configuring a Redundant Pair of VMA SAN Gateways process guide at <http://hp.com/go/vma-docs> before you begin the installation.

System Configuration Examples

This section provides an overview of standard configurations supported for VMA-series SAN Gateway and HP VMA Array systems:

- [Single HP VMA SAN Gateway with 1–2 HP VMA-series Memory Arrays, Non Redundant](#) on page 12
- [Redundant Pair of VMA-series SAN Gateways with 1–2 HP VMA-series Memory Arrays, Highly Available](#) on page 12

Single HP VMA SAN Gateway with 1–2 HP VMA-series Memory Arrays, Non Redundant

Figure 1.1 shows a configuration of a single VMA-series SAN Gateway is directly connected to a group of up to two HP VMA-series Memory Arrays using PCIe cables. The HP VMA SAN Gateway must be connected to Port 1 on each Memory Array in x8 mode.

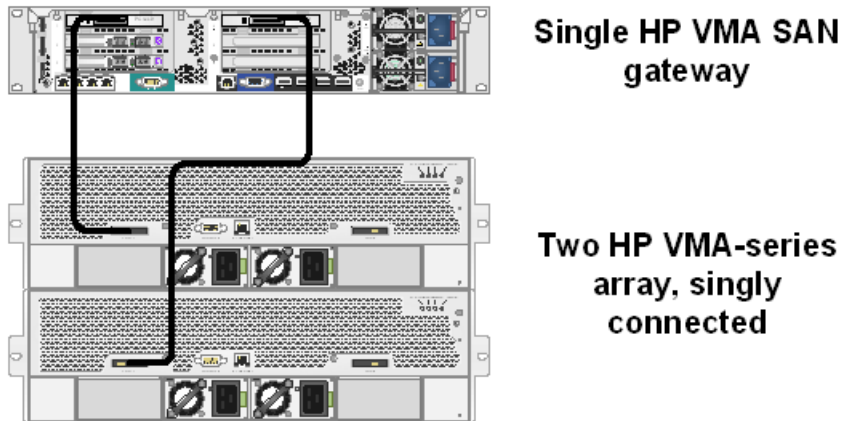


Figure 1.1 Single HP VMA SAN Gateway with 2 HP VMA-series Memory Arrays, Non-Redundant

Note: In the vSHARE software, *Port A* refers to the port that is labeled *Port 1* on HP VMA-series Memory Arrays. *Port B* refers to the port that is labeled *Port 2*.

Redundant Pair of VMA-series SAN Gateways with 1–2 HP VMA-series Memory Arrays, Highly Available

Figure 1.2 shows the most common configuration, a High Availability (HA) pair of VMA-series SAN Gateways that provide redundant access to a group of up to two HP VMA-series Memory Arrays.

In the example, SAN Gateway 1 is connected to Port A on each Memory Array, and SAN Gateway 2 is connected to Port B on each Memory Array. It is important that the Memory Gateways are cabled to the Memory Arrays using identical slots for HA pairs. That is, if PCIe Slot 1 on SAN

Gateway 1 is connected to Port A on Memory Array 1, then PCIe Slot 1 on SAN Gateway 2 must be connected to Port B on Memory Array 1.

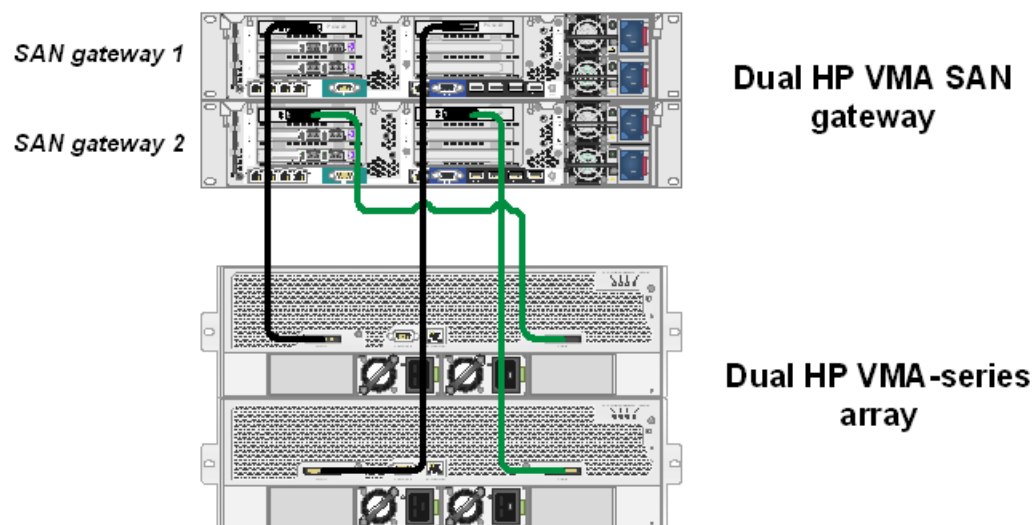


Figure 1.2 Redundant gateway pair of VMA-series SAN Gateways with 2 HP VMA-series Memory Arrays, Highly Available

The gigabit interfaces on each SAN Gateway, eth1 and eth2, are configured as a bonded interface (where two interfaces act as one), eth0. HA configurations require that the management traffic and cluster traffic both share the same physical links. A bonded network interface provides port/cable redundancy. For more information, see the *Configuring a Redundant Pair of VMA SAN Gateways* process guide at <http://hp.com/go/vma-docs> before you begin the installation.

Note: The Gateway Release Notes for Software OE G.5.5.1 has additional details for connecting the HP VMA SAN Gateway with the HP VMA-series array. Also, configuration and turning information per host operation system. Read these notes for this and other setup and configuration information at <http://hp.com/go/vma-docs>.

Note: If you are planning to install and setup dual gateways as a redundant pair for High Availability, refer to the *Configuring a Redundant Pair of VMA SAN Gateways* process guide at <http://hp.com/go/vma-docs> before you begin the installation.

This chapter covers the initial software setup for the HP VMA SAN Gateway, and covers the following topics:

- [Setup Task Map](#) on page 15
- [Requirements Checklist](#) on page 16
- [Defining the Configuration Type](#) on page 18
- [Configuring Nodes with the Setup Wizard](#) on page 21
- [Saving a Configuration](#) on page 28
- [Modifying an Existing Configuration](#) on page 28
- [Verifying vSHARE and Other Licenses](#) on page 29
- [Verifying Storage Media](#) on page 30

Setup Task Map

HP VMA SAN Gateway software setup includes the following tasks:

- | | |
|--------------------------|---|
| Before You Begin: | Fulfill the necessary prerequisites, as described in Requirements Checklist on page 16. |
| Task 1: | Defining the Configuration Type on page 18 |
| Task 2: | Configuring Nodes with the Setup Wizard on page 21 |
| Task 3: | Verifying vSHARE and Other Licenses on page 29 |
| Task 4: | Verifying Storage Media on page 30 |

Requirements Checklist

Before you begin the installation process, it is important that you have the necessary materials on hand and have met the other requirements on the following checklist:

	Requirement	Notes
☐	Laptop computer with terminal emulation software	PuTTY or similar emulation application
☐	Appropriate serial cables for the Memory Array and San Gateway	
☐	Network cable to attach between your laptop and a node, if necessary	
☐	USB to serial converter to connect the serial cable to your laptop	
☐	The appropriate SAN licenses, such as vSHARE	For more information, contact HP Customer Support as described in Getting Help on page 8

Table 2.1 Configuration Checklist

Gather the following information for each SAN Gateway node in preparation for the setup wizard.

	Information	Notes
☐	Public Interface IP address	
☐	Public Interface Netmask	
☐	Global Default Gateway	
☐	DNS Server Names (DNS server names in use at site)	
☐	Domain Name (site domain name)	
☐	Hostname (should have mg-a as part of the name)	
☐	Admin Password	
☐	Set Clock Time Zone	
☐	Zone to Use (set a specific time zone, or pick UTC)	
☐	NTP Server Name (IP address of the site's NTP server)	
☐	Email Notification Recipients (email addresses of people to receive VMA Memory system support e-mails)	
☐	Email Mailhub (IP address for the SMTP server, or resolvable name for the site)	
☐	Email Mailhub Port (typically 25, but verify for your site)	
☐	Enable HP Support?	
☐	Cluster Interface Name (for standalone gateway, eth1. For redundant gateway, local VLAN)	
☐	Cluster ID (this name is preloaded)	
☐	Cluster Name (choose a meaningful name)	

Table 2.2 Software Configuration Checklist

	Information	Notes
☐	Cluster Management IP Address (VIP for MG cluster access for redundant gateways.)	
☐	Cluster Management IP Netmask	
☐	Cluster Expected Nodes (Initially "1". Change the value after following instructions in the <i>Redundant Gateway Pairing Process Guide</i> .)	

Table 2.2 Software Configuration Checklist

Defining the Configuration Type

Before you begin the configuration process, you should have defined a configuration type and be familiar with its parameters.

- Standalone—Consists of one SAN Gateway with between one and two attached SAN Gateways, as shown in the [Single HP VMA SAN Gateway with 1–2 HP VMA-series Memory Arrays, Non Redundant](#) on page 12.

Note: A standalone SAN Gateway is considered to be a single node cluster. For this reason, you can configure the same parameters for a standalone SAN Gateway node as you would for the master node in a several node cluster.

- High-Availability (Redundant) Pair—Consists of two SAN Gateways, a designated master and standby node, and one or two HP VMA-series Arrays, as shown in the [Redundant Pair of VMA-series SAN Gateways with 1–2 HP VMA-series Memory Arrays, Highly Available](#) on page 12. Additional SAN Gateway nodes are designated as normal nodes.

Note: The pairing of two HP VMA SAN Gateway nodes for a High Availability (HA) or redundant configuration is achieved by following the Redundant Gateway Pairing Process documented in the *Redundant Gateway Pairing Process Guide*.

Master and Standalone Node Parameters

The first HP VMA SAN Gateway added to a HP VMA SAN Gateway cluster becomes the master node. A standalone SAN Gateway node is in effect a single master node cluster. For this reason, you are prompted to answer the same configuration questions for a standalone node as you would for the master node of a multi-node cluster. For an initial gateway bring-up, use the provided defaults for cluster interface name, cluster id, cluster management IP, and netmask values.

The master node is the default gateway for all cluster management tasks, such as analyzing performance for containers, LUNs, and targets; creating and exporting LUNs, or creating and deleting initiator groups.

All global cluster parameters are defined on the master node, and are automatically inherited by additional nodes as they are added to a cluster. The following chart lists the master or standalone node parameters for which the configuration wizard prompts you.

Public interface name	This specifies the Ethernet port that is used for specific gateway management. If only a single Ethernet cable will be used to connect the Gateway node, then eth1 should be used. If both eth1 and eth2 will be cabled to the network, then they should be bonded as eth0, and eth0 should be used as the public interface. For more information, see the <i>Redundant Gateway Pairing Process Guide</i> .
Public interface IP address	The public interface IP address for the individual gateway.

Note: DHCP is not recommended.

Public interface netmask	The public interface netmask.
Global Default gateway	The Default Gateway is set on a per-node basis.
DNS server name(s)	Specify a primary and, optionally, a secondary DNS server.
DNS Domain name	The name of your local domain.
Hostname	A local hostname for the HP VMA SAN Gateway.
Admin password	Setting a password is highly recommended.
Timezone	Set the clock timezone by specifying the zone and subzones. (Use "?" to display zone names interactively.)
NTP server	Optional and recommended.
Email notification recipients, mail hub, & port	Set recipients to <code>callhome-hp@vmem.com</code> for HP Customer Support and at least one email alias for your company, in a comma-separated list.
Enable HP support	Set autosupport to <code>yes</code> to ensure proper handling of support issues.
Cluster interface name	The interface for internal vCLUSTER traffic. In a single Gateway, this is eth1. A VLAN can be used instead with a redundant gateway configuration to separate vCLUSTER multicast traffic from management traffic. If using a VLAN, the cluster interface name is based on the VLAN ID. For example, if you use VLAN #14 then the cluster interface name is "vlan14". In a dual-cabled Gateway (in which both eth1 and eth2 are used) without a VLAN being used, then the eth0 bonded interface should be specified for the cluster interface name, refer to the <i>Redundant Gateway Pairing Process Guide</i> for profile configuration.

Cluster expected nodes	Set the number of nodes (HP VMA SAN Gateways) in the cluster to "1". Change the value as instructed in the <i>Redundant Gateway Pairing Process Guide</i> .
	Note: This is the expected number of HP VMA SAN Gateway nodes only. Do not include the number of HP VMA-series Arrays.
Cluster ID	The cluster id can be found in the login banner. The default is its preset value. This id should be changed for redundant gateway configurations.
Cluster name	The name of the cluster used by the Domain Name System (DNS).
Cluster management (virtual) IP address	The virtual IP address (VIP) for management of the cluster. The virtual address is assigned to the master node of the cluster, and redirected as needed whenever another node becomes the master (used only for redundant gateway config).
Cluster management (virtual) netmask	The virtual netmask for management of the cluster. The virtual netmask is assigned to the master node of the cluster, and redirected as needed whenever another node becomes the master (used only for redundant gateway config).

Secondary Node Parameters

A secondary node in a cluster automatically inherits all the global cluster parameters from the master node. Hence, there are fewer questions in the configuration wizard to answer for the standby node.

The following table lists the configuration parameters for secondary nodes, along with a description for each.

Public interface name	This specifies the Ethernet port that is used for cluster management. If only a single Ethernet cable will be used to connect the SAN Gateway node, then eth1 should be used. If both eth1 and eth2 will be cabled to the network, then they should be bonded as eth0, and eth0 should be used as the public interface. For more information, see the Redundant Gateway Pairing Process guide.
Public interface IP address	The public interface IP address.
	Note: DHCP is not recommended.
Public interface netmask	The public interface netmask for the individual gateway.
Default gateway	The Default Gateway is set on a per/node basis. When a node is part of a cluster, the Global Default Gateway takes precedence. The Default Gateway is recommended for access to a cluster from outside of the local network of a node.

Global default gateway	Enable or disable. The Global Default Gateway is set and used for the cluster. It is recommended that you enable the global default gateway.
DNS server name(s)	Specify a primary and, optionally, a secondary DNS server.
DNS Domain name	The name of your local domain.
Hostname	A local hostname for the HP VMA SAN Gateway.
Admin password	Setting a password is highly recommended.
Timezone	Set the clock timezone by specifying the zone and subzones. (Use "?" to display zone names interactively.)
NTP server	Optional and recommended.
Email notification recipients, mail hub, & port	Set recipients to <code>callhome-hp@vmem.com</code> for VMA Customer Support and at least one email alias for your company, in a comma-separated list.
Enable VMA support	Set autosupport to <code>yes</code> to ensure proper handling of support issues.

Configuring Nodes with the Setup Wizard

This section demonstrates how to use the setup wizard to configure every HP VMA SAN Gateway in a cluster, and covers the following topics:

- [Prerequisite](#) on page 21
- [Logging in to the SAN Gateway](#) on page 22
- [How to Get Help During the Configuration](#) on page 23
- [Configuring a HP VMA SAN Gateway Master/Standalone Node](#) on page 23
- [Configuring a Secondary HP VMA SAN Gateway Node](#) on page 27

Caution: If you are planning a High Availability (HA) redundant pair installation, follow the requirements and procedures described in the *Redundant Gateway Pairing Process guide* at <http://www.hp.com/go/vma-docs>.

Prerequisite

When you connect to the public interface, you are automatically prompted to log in.

Note: The admin user does not have a default password.

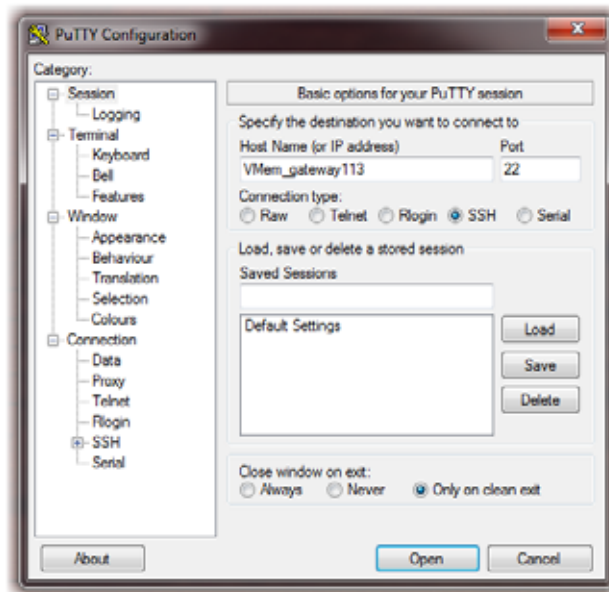
Logging in to the SAN Gateway

The configuration process is done through a locally connected KVM setup or a terminal emulator window (such as PuTTY) connection to the SAN Gateway node.

To log in to the SAN Gateway node, do the following:

1. Launch a terminal window, enter the host name or IP address of the SAN Gateway node in the appropriate text field, and open.

The following example shows a PuTTY launch dialog.



A terminal window appears, or use a KVM setup locally connected to the gateway.

2. Log in as admin.



The configuration wizard prompts you for an initial configuration of the HP VMA SAN Gateway.

3. Review [How to Get Help During the Configuration](#) on page 23, then proceed with [Configuring a HP VMA SAN Gateway Master/Standalone Node](#) on page 23.

How to Get Help During the Configuration

The configuration displays information on how to get help at the beginning of the wizard script, as shown in the following example:

```
Violin Memory Gateway configuration wizard

Press '?' for help, Ctrl+B to go back to the previous step.
Default value is in square brackets: press Enter to accept it.
Press Ctrl+R to clear default to enter empty string.
Press Ctrl+C to jump to the end of the wizard at any time.
```

To get help with the current step in the wizard, enter "?". For example, for help with the timezone type "?" to view the possible values:

```
...
Step 10: Set clock timezone? [yes]
Step 11: Zone to use? [UTC] America
Step 12: Sub-zone 1 to use? [Caribbean] ?

Caribbean Central North South

Press '?' for help, Ctrl+B to go back to the previous step.
Default value is in square brackets: press Enter to accept it.
Press Ctrl+R to clear default to enter empty string.
Step 12: Sub-zone 1 to use? [Caribbean] North
Step 13: Sub-zone 2 to use? [Canada] United_States
Step 14: Sub-zone 3 to use? [Alaska] ?

Alaska Arizona Central Eastern Hawaii Mountain Other Pacific
Press '?' for help, Ctrl+B to go back to the previous step.
Default value is in square brackets: press Enter to accept it.
Press Ctrl+R to clear default to enter empty string.
Step 14: Sub-zone 3 to use? [Alaska] Pacific
Step 15. NTP server name(s)? [0.0.0.0] 10.1.1.2
...
```

Configuring a HP VMA SAN Gateway Master/Standalone Node

The configuration wizard interactively configures the cluster settings, prompting you at each step to enter a value or accept the default (or the current setting, if previously configured). After the last step, the wizard repeats your settings and lets you return to any step if you want to make more changes.

The fastest way to configure a master or standalone HP VMA SAN Gateway node is with the setup configuration wizard.

Note: Interface bonding and cluster VLAN configuration are not included in the configuration wizard setup. For initial cluster setup, or for single-Ethernet cable to Gateway configurations, you can specify the eth1 interface as the “Public interface name” and “Cluster interface name” in the wizard. Then configuration of the interface bonding and VLAN using the CLI will be done in the *Redundant Gateway Pairing Process Guide*.

To configure the master or standalone SAN Gateway node, do the following:

1. Log in to the SAN Gateway as admin, as described in [Logging in to the SAN Gateway](#) on page 22.
2. The configuration wizard prompts you for an initial configuration of the HP VMA SAN Gateway. Enter **Yes** (the first letter must be capitalized).

```
Do you want to use the wizard for initial configuration? Yes
```

You are prompted to answer a series of configuration questions. The responses given for each question will configure the initial HP VMA SAN Gateway, which becomes the master node.

3. After the first question, enter **Yes**.

```
Step 1: Configure as master/stand-alone? [yes]
```

Entering Yes defines the current HP VMA SAN Gateway as the master node, whether for a single node cluster (standalone) or a redundant gateway pair. For information on configuring a redundant gateway pair, see the *Redundant Gateway Pairing Process Guide* at <http://www.hp.com/go/vma-docs>.

4. Enter a value or press the Enter key to accept the default value shown in square brackets (if one is present).

```
Step 2: Public interface name? [eth1]
Step 3: Public interface IP address? [10.1.14.200]
Step 4: Public interface netmask? [255.255.252.0]
Step 5: Global default gateway? [10.1.12.1]
Step 6: DNS server name(s)? [10.1.12.5]
Step 7: Domain name? [my.storageco.int]
Step 8: Hostname? [my-gateway1]
Step 9: Set clock timezone? [yes]
Step 10: Zone to use? [America]
Step 11: Sub-zone 1 to use? [North]
Step 12: Sub-zone 2 to use? [United_States]
Step 13: Sub-zone 3 to use? [Pacific]
Step 14: NTP server name(s)? [10.1.1.5,10.1.12.5]
Step 15: Email Notification recipient(s)? [admin@mystorageco.com]
Step 16: Email mailhub? [10.1.6.20]
Step 17: Email mailhub port? [25]
Step 18: Enable Violin support? [yes]
Step 19: Admin password (Enter to leave unchanged)?
Step 20: Cluster interface name? [eth1]
Step 21: Cluster expected nodes? [1]
Step 22: Cluster id? [99999-9999-1107]
Step 23: Cluster name? [gateway-cluster1]
Step 24: Cluster mgmt IP address and masklen? [0.0.0.0]
```

Note: VLAN and interface bonding configuration as used for configuration of a redundant gateway pair is not part of the configuration wizard must be configured using the CLI. For information on how to set up bonding and configure a VLAN, see the *Redundant Gateway Pairing Process Guide*.

5. After you complete the questions, the configuration wizard displays your responses and prompts you to press **Enter** to accept and save the settings:

```
To change an answer, enter the step number to return to.
Otherwise hit <enter> to save changes and exit.
```

```
Choice: █
```

The configuration wizard displays the HP VMA SAN Gateway cluster settings, as shown in the following example, then exits to the CLI.

```
You have entered the following information:
```

1. Configure as master/stand-alone: yes
2. Public interface name: eth1
3. Public interface IP address: 10.1.14.200
4. Public interface netmask: 255.255.252.0
5. Global default gateway: 10.1.12.1
6. DNS server name(s): 10.1.12.5
7. Domain name: my.storageco.int
8. Hostname: my-gateway1
9. Set clock timezone: yes
10. Zone to use: America
11. Sub-zone 1 to use: North
12. Sub-zone 2 to use: United_States
13. Sub-zone 3 to use: Pacific
14. NTP server name(s): 10.1.1.5,10.1.12.5
15. Email Notification recipient(s): admin@mystorageco.com
16. Email mailhub: 10.1.6.20
17. Email mailhub port: 25
18. Enable Violin support: yes
19. Admin password (Enter to leave unchanged): (unchanged)
20. Cluster interface name: eth1
21. Cluster expected nodes: 1
22. Cluster id: 99999-9999-1107
23. Cluster name: gateway-cluster1
24. Cluster mgmt IP address and masklen: 0.0.0.0

```
To change an answer, enter the step number to return to.  
Otherwise hit <enter> to save changes and exit.
```

```
Choice: █
```

```
Configuration changes saved.
```

6. To return to the configuration wizard after exiting, enter the command `configuration jump-start` in the CLI.

Caution: The configuration `jump-start` command should only be used during the initial installation of a specific gateway.

Configuring a Secondary HP VMA SAN Gateway Node

Configuring a secondary SAN Gateway node is similar to configuring an additional node in a SAN Gateway cluster (a standby or normal node).

Note: If you are configuring an additional node in a cluster, you should have successfully completed the procedure described in [Configuring a HP VMA SAN Gateway Master/Standalone Node](#) on page 23.

- **Standby node:** The second node added to the cluster is automatically designated as the secondary node. Should the master node fail, the secondary node replaces it and becomes the master node and cluster management traffic is automatically redirected to the new master node.

All global cluster parameters defined on the master node are automatically inherited by the secondary node added to the redundant pair. Consequently, the configuration of the secondary node requires only seven steps as compared to the 25 steps required to configure the master node.

- **Normal nodes:** Each additional SAN Gateway added to the cluster is defined as a normal node. During the course of vCLUSTER operation, a normal node can assume the role of standby or master. There is always only a single master and at most a single standby node.

Prerequisite

You will need the following information:

- Public interface name—public interface name defined for the secondary node
- Public interface IP address—public interface IP address for this Secondary Gateway
- Public interface netmask—netmask for the public interface IP address
- Hostname—hostname for this secondary Gateway
- Cluster interface name—the interface name configured on the master node
- Cluster ID—cluster ID is pre-configured with HP VMA SAN gateway and should not be changed at this time.

Configuring a Node

To configure a HP VMA SAN Gateway node as a redundant pair, refer to the *Redundant Gateway Pairing Process Guide* at <http://www.hp.com/go/vma-docs>

Saving a Configuration

You can save configuration parameters to persistent storage in the active configuration file from the CLI using the configuration write command, as shown in the following example.

```
gateway02 [cluster1: master] (config) # configuration write
```

Note: It is recommended that you save the current configuration before making any modifications to the configuration. This provides a backup configuration file, in case you want to revert to previous settings.

Modifying an Existing Configuration

After the initial configuration parameters are set, you can modify and manage the configuration through the Web Interface or the command line interface (CLI).

Note: The VMA Gateway Web Interface provides a subset of the commands available in the CLI. However, it is recommended that you use the VMA Gateway Web Interface for ease of use.

Supported Web Browsers

This section provides information on the VMA Gateway Web Interface requirements for browsers, display resolution, Adobe Flash Player, JavaScript, and cookies.

The following table lists the supported browsers and versions for the VMA Gateway Web Interface.

Operating System	Supported Browsers
Linux	Mozilla Firefox 4 and above
	Google Chrome 11 and above
Windows	Windows Internet Explorer 9 and above
	Mozilla Firefox 4 and above
	Google Chrome 11 and above

Table 2.3 Supported Web Browsers

Note: For Windows Internet Explorer, Compatibility Mode should be turned OFF.

The following table lists the recommended software and settings for optimum performance of the VMA Gateway Web Interface.

Recommendation	Description
Display resolution	The minimum recommended display resolution for the VMA Web Interface is 1024 by 768 pixels.
JavaScript	JavaScript must be enabled for the VMA Gateway Web Interface.
Adobe Flash Player	Adobe Flash Player version 8 (or above) is required for viewing charts in the VMA Gateway Web Interface.
Cookies	Enable cookies for login and session management. Cookies are also used to store dashboard page settings.

Table 2.4 Recommended for the VMA Gateway Web Interface

Accessing the VMA Gateway Web Interface

You must use a supported browser with JavaScript and cookies enabled, as described in [Supported Web Browsers](#) on page 28.

To access the VMA Gateway Web Interface, do the following:

1. Open a (supported) browser window.
2. Enter the following URL in the address field, substituting the variable in <brackets> with the actual value for your system.

```
http://<Gateway_IP_address_or_hostname>
```

The log in page appears.

3. Log in as admin user.

For more information, see the *HP VMA SAN Gateway User's Guide*.

Verifying vSHARE and Other Licenses

This section demonstrates how to verify that vSHARE and other installed licenses are active on the HP VMA SAN Gateway.

To verify the vSHARE and other installed licenses, do the following:

1. Log in to the master node as admin and enter enable mode.

```
login as: admin
{cluster: master} > enable
#
```

2. Enter the following command.

```
# show license
```

Output similar to the following appears:

```
License 1: LK2-VSHARE-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX
  Feature:          VSHARE
  Valid:            yes
  Tied to cluster ID: 99999 (ok)
  Active:           yes

License 2: LK2-RESTRICTED_CMDS-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX
  Feature:          RESTRICTED_CMDS
  Valid:            yes
  Tied to cluster ID: 99999 (ok)
  Active:           yes
```

Note: If an installed license shows "no" as the Active output, an error may have been made when inputting the license key. Double-check the valid license key against the key that is shown in the show license output.

Verifying Storage Media

This section demonstrates how to verify the devices that are used by the SAN Gateway. For more information, see the "Command Line Interface Reference" appendix of the *SAN Gateway User's Guide*.

To verify the devices used by the SAN Gateway, do the following:

1. Log in to the master node as admin and enter enable mode.

```
login as: admin
{cluster master} > enable
#
```

2. Enter the following command.

```
# show media
```

All media devices are shown that can be used by the current VMA Memory Gateway (node or module) as block storage or caching media. A summary line for each device location is shown, giving the size and status of that device. Media used by the system for other purposes are not shown.

VMA SAN Gateway Management and Configuration

This chapter covers VMA SAN Gateway configuration and management tasks and includes the following topics:

- [VMA SAN Gateway Management Overview](#) on page 31
- [Prerequisites](#) on page 32
- [Configuring Interface Bonding](#) on page 32
- [Gateway Network Configuration Guidelines](#) on page 36
- [Managing a Redundant Gateway Pair](#) on page 37

VMA SAN Gateway Management Overview

You can group together redundant HP VMA SAN Gateway pairs and connected HP VMA-series Array nodes into a management group to create a virtual system that can be managed and monitored as a single unit. A SAN Gateway management group consists of one or two HP VMA SAN Gateway nodes, designated as follows:

- **Master node:** The first node added to a cluster becomes the active master node. For more information, see [Configuring a HP VMA SAN Gateway Master/Standalone Node](#) on page 23.
Note: A standalone SAN Gateway is a single node cluster, configured as a master node.
- **Secondary node:** The second node in a cluster becomes the secondary node. Should the master node fail, the secondary node automatically becomes the master node through which management traffic is redirected. For more information, see [Configuring a Secondary HP VMA SAN Gateway Node](#) on page 27.

Note: At any one time, there can only be one active master node and one standby node in a cluster.

Prerequisites

You should have already successfully completed the following tasks.

- Configured the master HP VMA SAN Gateway node, defining the global cluster parameters in the process.
- Set up HP VMA-series Memory Array nodes, as described in the *HP VMA-series Memory Array Installation and Service Guide*.
- Configured a secondary HP VMA SAN Gateway, taking on the global cluster parameters of the master VMA SAN Gateway node.

For more information on these topics, see [CHAPTER 2, “Software Setup and Configuration”](#) on page 15.

Configuring Interface Bonding

To form a management cluster, the Gigabit interfaces on each Gateway (eth1 and eth2) must be configured as the bonded interface eth0.

Note: Redundant gateway pair configurations require that the management traffic and cluster traffic both share the same physical links. You can configure a bonded network interface to provide port/cable redundancy. For more information, see [CHAPTER 4, “High Availability Configuration”](#) on page 49.

Interface bonding is the bundling of several physical ports together to form a single logical channel. One bonding method is Link Aggregation Control Protocol (LACP), which can be used to allow network devices to negotiate the automatic bundling of links with other devices that implement LACP.

Guidelines for Interface Bonding

When implementing interface bonding, follow these guidelines:

- Bond one or more network interfaces together using the `network bond` command.

For interface bonding, eth0 is defined as a bonded interface consisting of two or more network interfaces. All bonded interfaces share the same subnet. The Integrated Lights Out (iLO) management port cannot be configured for general gateway management tasks. For more information on interface bonding see *HP VMA SAN Gateway User’s Guide*.

- When using LACP, ensure that all network switches are LACP-enabled.

Depending on the switch's capabilities and configuration, the port LACP settings may be either active or passive. Active mode is recommended, because only aggregated traffic is expected from the HP VMA SAN Gateway. For more information, see the *HP VMA SAN Gateway User's Guide*.

Interface Bonding Example

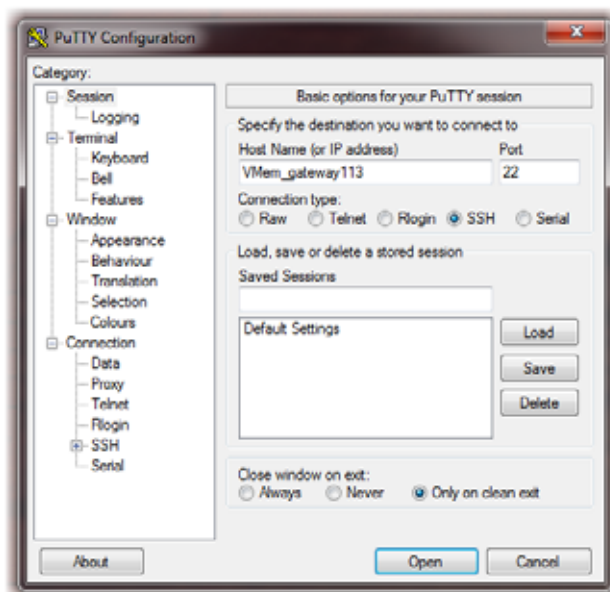
There are many types of bonding modes available, some of which require changing network switch settings. See the *HP VMA SAN Gateway User's Guide* for more information on these modes.

The following example demonstrates how to configure a round-robin balance mode for a bonded interface that does not require any switch changes. This creates a round-robin bond (eth0), that effectively combines the eth1 and eth2 interfaces with eth0 virtual IP address (VIP).

To configure a round-robin balance mode interface bond, do the following:

1. Launch a terminal window, enter the host name or IP address of the master SAN Gateway node in the appropriate text field, and open.

The following screenshot is an example of a PuTTY launch dialog.



A terminal window appears.

2. Log in as admin.

```
login as: admin
```

3. Enter enable mode, and then configure terminal with the following commands.

```
> enable  
# configure terminal
```

4. Enable bonding using the following commands:

```
(config) # network bond eth0 interface eth1 interface eth2 mode balance-rr  
(config) # cluster interface eth0  
(config) # cluster master interface eth0  
(config) # wr mem
```

5. Repeat steps 1 through 4 on the secondary node.
6. Reboot both HP VMA SAN Gateway nodes to reconnect the cluster.

VLAN Cluster Interface

You can hide the cluster multicast traffic using a VLAN for the cluster interface. This requires changing network settings on your network switch. For information on how to set this up, see the administration guide for your network switch.

Gateway Management Network Configuration

You must configure network switches and network connections for the cluster nodes, so that the master and secondary nodes in a management group can communicate with each other.

Configuring Network Switches

Setting up and defining the network switches for the HP VMA SAN Gateway management group includes the following tasks:

- [Defining Initial IP Addressing](#) on page 35
- [Defining Additional Parameters](#) on page 36
- [Defining Cluster Name and Node Names](#) on page 36

Before you Begin

Gather the following information for each node in a HP VMA SAN Gateway cluster:

- IP addresses
- Public interface IP address
- Netmask
- Cluster management virtual IP (VIP) address
- HP VMA-series Array IP address

Defining Initial IP Addressing

The following IP address assignments must be performed via serial console or direct connected to the network switches of the HP VMA SAN Gateway:

- **Public Interface Name and IP Address:** For each node, define the public interface name, IP address, and an associated netmask for the system's private address requirements. (DHCP can be used for these addresses; however, most installations use static IP addresses.)
- **Cluster Management VIP:** Define the cluster management virtual IP address. The cluster management VIP directs all cluster management traffic to the public interface on the master node.
- **HP VMA-series Array IP Address:** Define the Memory Array network management IP address.

Defining Additional Parameters

Set the following parameters via the serial console port on the Master SAN Gateway, or via the management VIP address:

- Global network parameters: Default Gateway or DNS Server information.
- NTP Server IP address for time synchronization.
- SMTP Server IP address for email configuration.
- Private VLAN for communication between redundant gateway pairs.

Defining Cluster Name and Node Names

Set the cluster name and the name for each HP VMA SAN Gateway node via the serial console port on the Master Gateway, or via the cluster management VIP address:

- Define the cluster name to identify the VMA-series SAN Gateway redundant pair.
- Define the names for each HP VMA SAN Gateway in the pair. Typically, these would be given obvious names such as “vmg-n1” and “vmg-n2” or something similar.

Configuring Network Connections

The next step is to configure support on the network switches for bonded interfaces and VLANs, as described in the following topics:

- [Gateway Network Configuration Guidelines](#) on page 36
- [Management VLAN Configuration](#) on page 37

Gateway Network Configuration Guidelines

For illustrated examples of correct gateway cabling, see [System Configuration Examples](#) on page 11.

- Use single Ethernet to eth1 for each Gateway node. Set the cluster interface and the cluster master interface (mgmt) to eth1.
- Connect eth1 and eth2, and then bond as eth0. Cluster interface and cluster master interface (mgmt) are then set to eth0.
- Connect eth1 and eth2, and then bond as eth0. Configure the management interface for VLAN on eth0 bond and the cluster master interface (mgmt) set to eth0.

Note: For a redundant configuration, the management and cluster interfaces should be bonded to a single interface, eth0. That interface then becomes the management and cluster interface. For more information, see [CHAPTER 4, “High Availability Configuration”](#) on page 49.

Management VLAN Configuration

The VMA-series SAN Gateway can use a separate network for low-latency, low-bandwidth communication between HP VMA SAN Gateways in a cluster.

To separate redundant gateway network traffic from management traffic, you can configure a virtual local area network (VLAN). Network switches must also be configured to provide a private VLAN if it will be used for the cluster network traffic.

For best performance and minimal impact on the customer network, HP recommends configuring a private network for use by the cluster through VLAN tagging.

When VLANs span multiple switches, VLAN Tagging is highly recommended. A VLAN creates an independent logical network within a physical network. VLAN Tagging is the process of inserting a VLAN ID into a packet header in order to identify which VLAN the packet belongs to.

Each network switch port connected to a HP VMA SAN Gateway should be configured to allow VLAN-tagged traffic for the given management VLAN ID. This is a configurable option that you can change to suit your network setup. For more information on VLAN commands, see the *HP VMA SAN Gateway User's Guide*.

Some switch vendors, including Cisco, do not allow untagged traffic over an LACP link. If you are using this type of switch, you must provide the HP VMA SAN Gateway with the public-facing VLAN (in addition to the cluster VLAN) and tag the ports appropriately.

Note: Multicast DNS (mDNS) is used for cluster communication, and so must be allowed on all switches. Use the IP multicast group address (224.0.0.251).

Managing a Redundant Gateway Pair

Management of a redundant gateway pair includes monitoring the HP VMA SAN Gateway nodes, stopping or rebooting nodes, and upgrading the software running on the nodes. For information on how to manage gateway nodes, see the *HP VMA SAN Gateway User's Guide*.

For information on upgrading SAN Gateway nodes, see [CHAPTER 5, “Memory Gateway Software Upgrades”](#) on page 75.

Caution: Be sure to check the current Release Notes for the latest recommendations before beginning a gateway software upgrade.

Configuration File Management

Changes made to the configuration of a HP VMA SAN Gateway redundant pair take effect immediately. Those changes can be lost if they are not saved to a configuration file, however. The HP VMA SAN Gateway redundant pair stores one or more configuration files on persistent storage, one of which is designated as the *active configuration file*.

The active configuration file is where configuration changes are stored when you save a configuration. Whenever the gateway reboots, it loads the configuration settings from the file designated as active. The gateway backs up the active configuration file automatically.

For more information on managing configuration files, see the *HP VMA SAN Gateway User's Guide*.

User Roles

User management privileges are set by assigning one of the following roles to a user account:

- **admin:** The administrator role has full privileges to view anything, take any action, or change any configuration. This role can access every page in the VMA Gateway Web interface.
- **monitor:** The monitor role can read all data and perform some actions, such as rebooting the system and configuring various system parameters, but cannot change the configuration of the VMA-series SAN Gateway. This role can view some of the pages in the Web interface.

Caution: Initially these accounts have no password. Setting a password for the admin role is highly recommended.

The CLI command modes `configure`, `enable`, and `standard` correspond to the admin and monitor roles. For more information on managing users using the CLI and VMA Gateway Web interfaces, see the *HP VMA SAN Gateway User's Guide*.

Upgrading the Gateway Software

Part of managing a gateway is keeping the software version up to date. Upgrading the HP VMA SAN Gateway software requires that you obtain the latest software release, run a command to distribute and install the software on each HP VMA SAN Gateway, and then reboot the cluster.

This chapter demonstrates how to replace a HP VMA SAN Gateway node in a redundant pair, and covers the following topics:

- [Prerequisites](#) on page 39
- [Procedure Steps](#) on page 40
- [Completing the Replacement](#) on page 41

Prerequisites

A typical VMA gateway configuration consists of one or two HP VMA SAN Gateways, one of which is designated as the master node (mg-b) and one which is designated as the secondary node (mg-a). For more information on HP VMA Array redundant pairs, see the *HP VMA SAN Installation and User's Guide*.

The following naming conventions apply in the replacement procedure:

- **mg-a** is the node that is being replaced in a redundant gateway pair
- **mg-b** is the active master node of the redundant gateway pair

Gather the following information before you begin the procedure to replace the gateway node (mg-a):

- Existing cluster ID (for the master node mg-b)
- Static IP address for master node mg-b
- Static IP address for node mg-a being replaced
- Netmask for node mg-a being replaced

Procedure Steps

Use this procedure to power down and remove a VMA Gateway node from a redundant gateway, then configure a replacement VMA Gateway node.

Note: When a new factory shipped VMA Gateway node is first powered on, the configuration values are set to the system defaults. You have to change the default settings to add the node to the redundant pair.

To replace a Memory Gateway node in a redundant pair, do the following:

1. Connect and log in to the mg-a VMA Gateway node to be replaced as admin.
2. Shut down the node using the following command:

```
mg-a [violin: standby]# reload halt
```

3. Unplug and remove the failed Gateway node being replaced.
4. Rack and cable the replacement Gateway node. For more information, see the *HP VMA SAN Gateway Installation and User's Guide*.
5. Power up the replacement Memory Gateway, log in as `admin`, and follow the steps as described in "Using the Wizard to Configure the Master Node" in the *HP VMA SAN Gateway Installation and User's Guide*.
6. Accept the configuration options and exit the wizard. Then, watch for the state displayed on the command line prompt to ensure that it changes to "master".
7. Verify the version of software running on the newly replaced Memory Gateway (mg-a), using the following command:

```
mg-a [violin: master]# show version
```

8. Proceed to [Completing the Replacement](#) on page 41.

Completing the Replacement

Go to the section that represents your configuration, and follow the steps to complete the replacement:

- [Both Nodes Running G5.1.0](#) on page 41
- [G5.1.0 on mg-b and G5.2.0 or Higher on mg-a](#) on page 41
- [Both Nodes Running G5.2.0 or Higher](#) on page 41

Both Nodes Running G5.1.0

If both your existing Memory Gateway node (mg-b) and the newly replaced Gateway node are both running software version G5.1.0, complete the following steps:

1. While logged in to the newly replaced Memory Gateway node, enter the following command:

```
mg-a [violin: master]# cluster id <same_id_as_mg-b>
```

2. Watch the command line to ensure that the prompt changes to `standby`.

G5.1.0 on mg-b and G5.2.0 or Higher on mg-a

If your existing Memory Gateway node (mg-b) is running software version G5.1.0 and the newly replaced Gateway node is running G5.2.0 or higher, contact HP Customer Support.

Both Nodes Running G5.2.0 or Higher

If both your existing Memory Gateway node (mg-b) and the newly replaced Gateway node are both running software version G5.2.0, complete the following steps:

1. While logged in to the newly replaced Memory Gateway node, enter the following command at the prompt:

```
mg-a [violin: master]# no cluster enable
```

2. Next, enter this command after the prompt:

```
mg-a [violin: master]# fms enable
```

The prompt changes to look like the following:

```
mg-a [FRU: searching] (config) #
```

3. Log in to mg-b as admin, and enter the following command after the prompt:

```
mg-b [violin: master]# fms admit
```

The following is an example of the resulting output. The exact values will depend on your configuration.

```
Found 1 FRU Module(s) applying for cluster membership:
1) Module ID: 1ededc96b4c6, Internal Address
169.254.181.61
Please make a selection from the above list to admit it
to the cluster.
```

4. Enter the number of the node you want to admit into the cluster. In this example, the choice is 1.

```
Your Choice? [1] 1
You selected module 1 for admittance.
```

5. You can choose to use DHCP, or enter static IP information. This example uses static IP information.

```
Use DHCP? [yes] no
Please enter a routable IP address for this module.
Address? 10.1.10.140
```

6. Enter a valid netmask for the replacement node.

```
Please enter a valid netmask for this module.
Netmask? 255.255.252.0
You selected module 1 for admittance with IP address
10.1.10.140/22; module status has been successfully
updated.
Note: the new module can take several minutes to join the
cluster as it may need to upgrade itself before joining.
mg-b [violin: master] #
```

7. Go to the mg-a (newly replaced) node, and verify one of the following scenarios:

- If mg-a and mg-b nodes are running the same version of the software:
 - a. The prompt changes to violin-mga [FRU: join _pending] (config)
 - b. The mg-a node reboots.
 - c. The state displayed on the command line prompt changes to "standby".
- If mg-a and mg-b nodes are running different versions of the software:
 - a. The prompt changes to violin-mga [FRU: manufacturing] (config)
 - b. The mg-a node is updated with the same image (software version) mg-b is running. This can take several minutes to complete.
 - c. The mg-a node reboots.

d. The state displayed on the command line prompt changes to "standby".

8. Go to mg-b and execute the following command at the prompt:

```
mg-b [violin: master]# cluster expected-nodes  
<#_in_cluster>
```

This chapter describes vSHARE, its features and functions, and the steps required to configure the HP VMA SAN Gateway to manage block storage. The following topics are covered:

- [Understanding vSHARE](#) on page 44
- [Configuring Storage Containers](#) on page 47
- [Configuring Target Ports](#) on page 49
- [Configuring Initiator Groups](#) on page 51
- [Creating LUNs](#) on page 53
- [Exporting LUNs](#) on page 56

Understanding vSHARE

vSHARE runs as software on a HP VMA SAN Gateway enabling host systems (for example, database servers) to use the Fibre Channel transport protocols to access logical units of data (LUNs) stored within HP VMA-series Arrays.

On the host system, the LUN appears as a connected SCSI disk. The host formats and partitions the LUN. The storage system sees the contents of a LUN as a set of blocks of arbitrary data. Administrators may use vSHARE to define rules for controlling access to LUNs based on the containers, initiators and initiator groups, and target ports configured within the system.

- **Storage Containers:** An HP VMA-series Array comprises a storage container. Every LUN created and managed by vSHARE is created within a storage container. You can create many LUNs within a container. However, currently there is a one-to-one (1:1) mapping between an array and a container (one container per array).

- **Initiators and Initiator groups:** An initiator is a host or client that requires access to the LUNs stored in the containers. Multiple initiators may be grouped together in an initiator group (igroup). Access to the LUNs in a container may be restricted to specific initiators or initiator groups.
- **Targets:** A target identifies the port on the HP VMA SAN Gateway through which the initiator may access the LUNs stored in a container. Access to the LUNs in a container may be restricted by target port.

vSHARE System Architecture

The vSHARE architecture is ideal for applications that require rapid access to and processing of large amounts of data including enterprise databases, data warehouses and application servers.

A typical VMA configuration cluster consists of one or two HP VMA SAN Gateways running the vSHARE software application and one or more HP VMA-series Arrays.

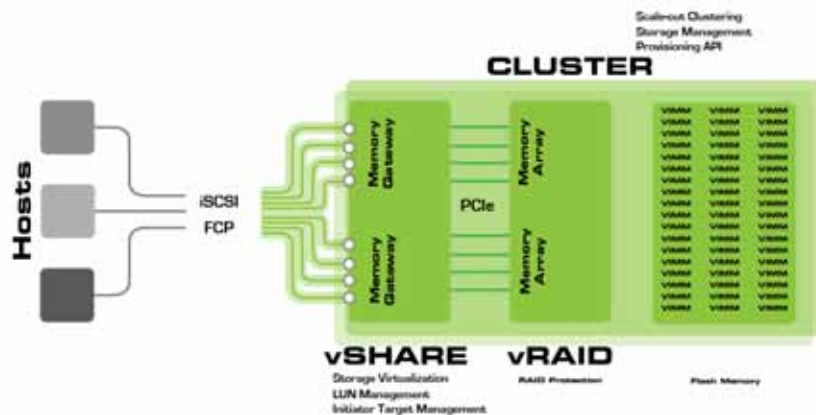


Figure 5.1 vSHARE System Architecture

The vSHARE application runs on HP VMA SAN Gateways and allows you to manage LUN and initiator-target relationships. The HP VMA SAN Gateways operate as the SAN targets and the hosts (such as a database server or application server) are the *initiators*.

The HP VMA SAN Gateway provides network connectivity, utilizing Fibre Channel protocols. The HP VMA SAN Gateway provides high performance processing, high bandwidth DRAM, and high bandwidth access to the HP VMA-series Arrays. All LUNs created and managed by vSHARE, are stored in containers, each container comprises a HP VMA-series Array that utilizes flash memory storage.

For maximum performance, Single Level Cell (SLC) flash is used. For capacity to support read-centric applications, Multiple Level Cell (MLC) should be used. The HP VMA SAN Gateways and HP VMA-series Arrays are connected via PCIe.

Configuration Overview

Configuring vSHARE is a prerequisite to using a HP VMA SAN Gateway for block storage. The vSHARE configuration allows you to define sophisticated rules for controlling access to the LUNs by initiator groups, initiators, or target ports.

Configuring target ports and initiator groups are optional steps in the vSHARE configuration process. Organizations that do not want to use LUN-masking can control access to LUNs through ports or switches. LUN masking is an authorization process used to make a logical unit number available to some hosts and unavailable to others.

To configure vSHARE, complete the following procedures:

1. [Configuring Storage Containers](#) on page 47. This step initializes the HP VMA-series Array to manage block storage and create one or more storage containers (partitions) to manage the LUNs. To format the HP VMA-series Array from vSHARE, the `media init` command is required. This command enables you to initialize one or more Memory Arrays to support block storage. Once a Memory Array has been initialized to support block storage, you may create one or more storage containers on each Memory Array, which may be used to store and manage LUNs.
2. **(Optional)** [Configuring Target Ports](#) on page 49. This step configures the target ports so they can control access to LUNs. Configuring target ports is useful for security and bandwidth management.
3. **(Optional)** [Configuring Initiator Groups](#) on page 51. This step configures the initiator groups, adding one or more initiators to each initiator group. You can restrict access to LUNs by initiator group, or on a per-initiator basis.
4. [Creating LUNs](#) on page 53.

LUNs are created within a storage container that comprises a particular HP VMA-series Array. A LUN inherits the attributes of the container (HP VMA-series Array) in which it is created.

Note: As of this release, one container comprises a HP VMA-series Array.

5. [Exporting LUNs](#) on page 56. This required step exports the LUNs to the initiator groups or initiators via target ports. Only those initiator groups or initiators to which the LUN is exported may access the LUN. Access may be further restricted to a specific target port.

Configuring Storage Containers

The first step in configuring a vSHARE HP VMA SAN Gateway is to format the HP VMA-series Arrays and create the containers needed to manage LUNs in the target storage on each Memory Array. LUNs are addressable subsets of the container in a Memory Array. When a LUN is created, it is assigned to a specific container and inherits the attributes of that container.

Note: As of this release, one container comprises a HP VMA-series Array.

Initializing HP VMA-series Arrays

To configure a HP VMA-series Array to support block storage, first initialize the HP VMA-series Array using the `media init` command.

Command Syntax and Parameters

This section describes the `media init` command syntax and available parameters.

Syntax

```
media init device <VIOLIN_MEMORY_ARRAY_> type [block]
[force] [name]
```

WARNING! Using the `force` option of the `media init` command (`media init <device_name> <block_name> force`) destroys the existing data on a Memory array. You should not use this command on a previously initialized Memory Array without first backing up the data on the Memory Array.

Parameters

<code>device <device></code>	The <code><device></code> parameter indicates the Memory Array to be initialized and is a string of the form: <code>ata-VIOLIN_MEMORY_ARRAY_<array_id></code>
<code>type</code>	The <code>type</code> parameter defines media, such as <code>block</code> (vSHARE).
<code>name</code>	The <code>name</code> parameter is used to name the partition. The default is to use the last 14 characters of the HP VMA-series Array serial number. To use a different name, add this parameter followed by a custom name of up to 14 alphanumeric characters in length.
<code>force</code>	The <code>force</code> parameter is used to force initialization of a HP VMA-series Array that has already been initialized.

Configuring Block Storage

This section demonstrates how to use the `media init` command to initialize a HP VMA-series Array connected to a VMA Gateway for block storage.

To initialize the HP VMA-series Array for block storage, complete the following steps:

1. Connect to the HP VMA SAN Gateway through a terminal port, such as PuTTY.
2. Enter Configure mode, using the following commands.

```
> enable  
  
# configure terminal  
  
(config) #
```

3. Enter the `media init` command to initialize the HP VMA-series Array.

```
(config) # media init device ata-VIOLIN_MEMORY_ARRAY_23108R000000043  
type block
```

This example generated the container ID: 23108R000000043.

4. (Optional) Use the `name` parameter to create a more intuitive name for the container ID. In the following example, the generated container ID is changed to FASTBOX1:

```
(config) # media init device ata-VIOLIN_MEMORY_ARRAY_23108R000000043  
type block name FASTBOX1
```

5. Confirm that you want to initialize the HP VMA-series Array.

```
Really initialize ata-VIOLIN_MEMORY_ARRAY_FASTBOX1 (all data will be  
lost)? [no] y
```

A message confirms that the HP VMA-series Array was successfully initialized.

```
media init completed successfully  
  
SM076 [NJ-Lab-vSHARE00: standby] (config) #
```

Viewing Containers

Once you have initialized the HP VMA-series Array, you can see the container that was created. This section covers how to use the `show containers` command to view existing containers.

Before a block media device can be used for block storage, it must be enabled. In the following steps, you use the `media block id <id> enable` command to enable the device.

To view existing containers, complete the following steps:

1. Log in as an administrator to the VMA Gateway attached to Port 1 of the HP VMA-series Array.
2. Use the `configure terminal` command to enter Configure mode.

```
# configure terminal
(config) #
```

3. Enter the `media block id all enable` command to enable all block containers.

```
(config) # media <tab>
(config) # media block id all enable
```

The `block` parameter ensures that you enable vSHARE devices. The `all` parameter ensures that every block container is enabled.

4. To view all the containers were created, enter the `show containers` command. Information about the containers displays.

```
> enable
# show containers
Container          LUNs   Total   Free Ports HostnameA      HostnameB
Status
-----
C-2                150    199G 50176M A,B   <hostname>  <hostname> cluster
```

Configuring Target Ports

The second step in configuring a HP VMA SAN Gateway is to configure the target ports. The target ports control access to a particular LUN, which may be useful for both security and bandwidth management.

This section covers the following topics:

- [Supported Target Ports](#) on page 49
- [Configuring Fibre Channel Target Ports](#) on page 50

Supported Target Ports

In a vSHARE system, the HP VMA-series Arrays are the *targets* and the host system (for example, one or more database servers or application servers) are the *initiators*. The storage systems have storage target devices (LUNs) that the hosts access through the HP VMA SAN Gateway.

The VMA SAN Gateway supports Fibre Channel target ports.

Every target is a specific port on a hardware Fibre Channel host bus adapter (HBA) installed in the gateway.

For Fibre Channel, the target ports are present when the HP VMA SAN Gateway boots.

A LUN may be exported through multiple target ports. Active-active multipathing is supported.

Configuring Fibre Channel Target Ports

For Fibre Channel, the target ports are present when the HP VMA SAN Gateway boots, if the HBAs are installed on the system.

To confirm that the vSHARE system can see the target ports prior to creating the initiator groups, use the `show targets` command. The `show targets` command enables you to view all target ports.

show targets Command

The `show targets` command lists all of the target ports and their addresses (wwn), filtered by various options.

Syntax

```
show targets [node <cluster node id>] [hostname <hostname>]  
[protocol fc] [id <target id>] [sessions] [detail]
```

Parameters

[node <cluster node id>]	Displays targets on node ID.
[hostname <hostname>]	Displays targets on hostname.
[protocol fc]	Displays targets using protocols.
[id <target id>]	Displays a specific target.
[sessions]	Displays targets including sessions.
[detail]	Displays in detail.

Configuring Initiator Groups

The third step in configuring the VMA SAN Gateway is to configure the initiator groups (igroups), which identify the initiators (hosts) that are allowed to access a LUN or set of LUNs.

Every initiator has a protocol-specific identifier. Fibre Channel initiators are identified by World-Wide Names (WWN). Fibre Channel initiators are fixed by the appropriate HBA port.

Initiator Group Configuration

To configure an initiator group, complete the following steps:

1. From the CLI, use the `enable` command (to enter Enable mode), and then the `configure terminal` command (to enter Configure mode).

```
> enable
# configure terminal
(config) #
```

2. Use the `igroup name` command to create an initiator group, as shown in the following example, replacing the `<my_igroup>` variable with the actual igroup name.

```
(config) # igroup create name <my_igroup>
```

3. Add one or more initiators to the igroup, using the `igroup addto` command. The `initiator_name` must be a valid name, such as, `wwn.21:00:00:1b:32:7a:18:65..`

```
(config) # igroup addto name <my_igroup> initiators
wwn.21:00:00:1b:32:7a:18:65
```

In the following example, two Fibre Channel initiators are added to the igroup. The `<my_igroup>` variable is a place holder for the actual igroup name.

```
(config) # igroup addto name <my_igroup> initiators
wwn.21:00:00:1b:32:9a:18:65 wwn.21:01:00:1b:32:ba:18:65
```

Fibre Channel initiator identifiers (WWN) are fixed by the HBA port. If you want to restrict LUN access to a particular initiator, you must get the appropriate the WWN from the Fibre Channel HBAs on the client machine.

4. To verify that the initiators were added to the initiator group, return to the CLI and enter the `show igroups` command.

```
(config) # exit
# show igroups
Initiator group: <my_igroup> #Initiators: 2
wwn.21:00:00:1b:32:9a:18:65
wwn.21:01:00:1b:32:ba:18:65
```

The `show igroups` command shows all initiator groups, the number of initiators within each group, and the WWN of those initiators.

igroup create Command

The `igroup create` command creates an initiator group and, optionally, one or more Fibre Channel initiators. Fibre Channel initiator identifiers (WWNs) are generated automatically by an HBA.

Syntax

```
[no] igroup create name <name>
```

Syntax Description

name	The name is alphanumeric only.
------	--------------------------------

Examples

The following examples demonstrate how the `igroup create` command can be used to manage initiator groups and initiators.

The following command creates an initiator group named FINANCE:

```
igroup create name FINANCE
```

The Cisco-style `no` prefix may be used to delete initiator groups or initiators. In the following example, the command deletes the `igroup FINANCE`.

```
no igroup create name FINANCE
```

igroup addto Command

The `igroup addto` command adds one or more initiators to a group.

Syntax

```
[no] igroup addto <igroup_name> initiators [initiator_name ...]
```

`igroup_name` The name is alphanumeric only.

`initiator_name` The initiator_name must be prefixed with “wwn.”

The following command adds three initiators to the initiator group named FINANCE:

```
igroup addto FINANCE initiators wwn.20:20:20:20:20:20:20:20:20
wwn.20:20:20:20:20:20:20:20:21 wwn.20:20:20:20:20:20:20:20:22
```

The following command removes the initiator `wwn.20:20:20:20:20:20:20:20:20` from `igroup FINANCE` and preserves the other two initiators (`wwn.20:20:20:20:20:20:20:20:21` and `wwn.20:20:20:20:20:20:20:20:22`).

```
no igroup addto FINANCE initiators wwn.20:20:20:20:20:20:20:20:20
```

Creating LUNs

The fourth step in configuring the vSHARE system is to create the LUNs. In vSHARE, LUNs are addressable subsets of the flash memory within the container that comprises a HP VMA-series Array. In many systems, a LUN may be referred to as a *volume* or *logical unit*.

Note: As of this release, one container comprises a HP VMA-series Array.

On the host system (initiator), the LUN appears as a local SCSI disk. The host may further format and partition the LUN. The target, or storage system, sees the contents of the LUN as a set of blocks of arbitrary data.

Every LUN is created within a container, and each container comprises a HP VMA-series Array. vSHARE implements LUNs at a minimum of 1 GB increments with the ability to configure up to 1024 LUNs per HP VMA SAN Gateway.

LUN Creation

To create a LUN, complete the following steps:

1. From the CLI, enter into Enable mode using the `enable` command and then Configure mode using the `configure terminal` command.

```
> enable
# configure terminal
(config) #
```

2. All LUNs are created and managed within a container. To view the available containers, use the `show containers` command.

```
> enable
# configure terminal
(config) # show containers
```

Check the size of the containers. LUNs are implemented in 1 GB increments; the size of the container may restrict the number of LUNs that may be created.

3. Enter the `lun create` command to create LUNs within a container.

```
(config) # lun create container <container_name> name <LUN_name> size
equal quantity 20 nozero
```

The command creates 20 LUNs of equal size in the container. Use the `nozero` option to ensure that the data is not zeroed-out, which could take considerable time depending on the size of the container.

Typically, fewer than 40 LUNs would be created within a container; however, the creation of up to 1024 LUNs is supported per container.

lun create Command

The `lun create` command enables you to create a LUN within a specified storage container connected to the VMA SAN Gateway.

Syntax

```
[no] lun create container <container_name> name <LUN_name> size [<size GB>
| equal] [quantity <number>] [nozero] [readonly] [startnum <unsigned
integer>] [blksize 512 | 4096] [offline]
```

Syntax Description

The following table shows syntax for LUN commands.

name	Defines the name of LUN to be created; used as a prefix if the quantity of LUNs created is greater than one.
------	--

<code>size</code>	Defines the size of each LUN in GB, or "equal" to divide the free space of the container equally among the new LUNs. A value of 0 (zero) may be used in place of "equal."
<code>container</code>	Identifies the name of the container in which the LUN is created.
<code>quantity</code>	Defines the number of LUNs to be created; the default is 1. If the number is greater than 1, the names of the newly created LUNs will be appended with an index number from <code>startnum</code> up to the number of LUNs created.
<code>nozero</code>	Specify to avoid zeroing-out the data on the LUNs, which could take a long time for large LUNs.
<code>readonly</code>	Creates the LUNs in read-only mode.
<code>startnum</code>	Defines starting index number for newly created LUNs. The default is 1.
<code>blksize</code>	Defines the logical block size for the created LUNs; the default is 512, and can be set to 512 or 4096. Not all systems can handle 4096-byte sizes. Use 512 if you are unsure.
<code>offline</code>	Creates the LUNs in offline mode.

lun set Command

The `lun set` command allows you to set the parameters of a LUN in a container. For example, you can set the LUN as read-only, as well as enable and disable the export of a LUN through one or both HP VMA SAN Gateways. For more information, see [Disabling HA Mode for a LUN or Container](#) on page 58.

The `lun set` command is the only command usable after a LUN has been created except the `no lun create ... readonly` command.

Syntax

```
[no] lun set container <id> name <name> readonly
```

show luns Command

The `show luns` command allows you to view various types of information about a LUN or LUNs.

Syntax

```
show luns [container] [name] [count] [reserved] [serial] [sessions]
```

Syntax Description

container	Displays only the LUNs within a specific container.
name	Displays a specific LUN.
count	Displays LUNs with active sessions and their count.
reserved	Displays LUNs with SCSI reservations.
serial	Displays the serial numbers for each LUN.
sessions	Displays the sessions accessing a particular LUN.

show containers Command

The `show containers` command displays all available containers.

Syntax

```
show containers
```

Exporting LUNs

The fifth step in configuring the vSHARE HP VMA SAN Gateway is to export the LUNs to an initiator. The LUN must be exported before it may be accessed over block protocols.

Note: vSHARE LUNs are defined and saved within the Arrays themselves. vSHARE LUN export records are, however, managed and stored within the vCLUSTER configuration database owned by the master node.

Access to LUNs may be restricted to a specific initiator group, initiator, or target port when the LUN is exported using the `lun export` command.

- The optional `[igroup | initiator]` parameter identifies the initiator group or initiator that may access the LUN.
- The optional `[port]` parameter identifies the target that may access the LUN.

A LUN ID is a SCSI identifier which may be used to differentiate between devices on the same target port. By default, vSHARE automatically assigns LUN IDs to LUNs when they are exported to an initiator group or initiator.

vSHARE optionally enables you to assign a special, user-defined LUN ID to a vSHARE LUN when you export LUNs to an initiator group or initiator. User-defined LUN IDs may make it easier differentiate between LUNs. If you do assign user-defined LUN ID, it is recommended that you specify a number below 255, as some operating systems (for example, Windows) will only discover LUN IDs between 0 and 254. LUNs cannot be exported if they are assigned an existing LUN ID; an error message is returned and the export fails.

lun export Command

The `lun export` command enables you to export the LUNs within a specific container to an initiator or initiator group. A single LUN may be exported multiple times through different target ports (multipathing) or to different initiators (shared access).

Syntax

```
[no] lun export container <container_name> name <lun_name> [lunid] [to  
<igroup | initiator>]... [using <port ...>]
```

Syntax Description

<code>lun_name</code>	The <code>lun_name</code> could be wildcard specified, such as <code>FINANCE*</code>
<code>container <container_ID></code>	Name of the container.
<code>name <lun_name></code>	Name of the LUN.
<code>lunid</code>	Designates the LUN ID assigned to an exported LUN. By default, LUN IDs are automatically assigned by vSHARE. User-defined LUN IDs may be specified to track specific LUNs.
<code>igroup</code>	The name of the igroup. If no igroup or initiator is specified, all initiators will have access to the LUN.
<code>initiator</code>	The WWN (Fibre Channel) name of the initiator.
<code>port</code>	The port is Fibre Channel wwn ID.

Optimizing Connectivity to Storage Arrays for Windows

Depending on the Windows operating system, client machines connected to the VMA SAN Gateway should use the Microsoft® Multipath I/O (MPIO) driver for optimal storage array connectivity. Install the appropriate driver for your operating system.

Windows Server 2008 R2 and Above

Install the Microsoft MPIO driver. MPIO is not installed by default. Use the following link for installation instructions.

Installing and Configuring MPIO for Windows Server 2008 R2:

[http://technet.microsoft.com/en-us/library/ee619752\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/ee619752(WS.10).aspx)

In HA configurations, you must ensure a proper MPIO operation when a HP VMA SAN Gateway failure occurs.

To ensure a proper MPIO operation, complete the following steps:

1. Install SP1 on Windows Server 2008 R2.
2. Install HotFix KB2522766 (from the Microsoft Support site).
3. Install HotFix KB2460971 (from the Microsoft Support site).
4. Install Hotfix KB2468345 (see the Microsoft Support site)
5. Install Hotfix KB2531907 (see the Microsoft Support site)
6. Install Hotfix KB2591462 (see the Microsoft Support site).

To change the load balance policy setting, complete the following steps:

1. Open the Registry Editor and navigate to:
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\v1010dsm\Parameters\DsmLoadBalanceSettings\<EnumeratedViolin LUN>
2. Modify DWORD: DsmLoadBalancePolicy and change the value to 2 for all discovered LUNs.
3. Restart the client machine.

Disabling HA Mode for a LUN or Container

By default, LUNs are online via all available ports. LUNs are considered to be in HA mode when they are online via both ports in the Array. If necessary, such as for debugging purposes, you can explicitly take a LUN or a container out of HA mode, so that it is accessible via only one port.

For example, the following command removes the FINANCE LUN from HA mode by setting it offline for Port B, and making it accessible only from Port A:

```
(config) # no lun set container Strad201 name FINANCE port B online
```

When the LUN has been taken out of HA mode, the `show luns` command displays the status of the LUN as `Single` and indicates the port from which it is online. For example:

```
# show luns
```

```
Container: Strad201
```

LUN	Size	RW	Bksz	Status	Ports
-----	------	----	------	--------	-------

FINANCE	10240M	rw	512	Single	A
---------	--------	----	-----	--------	---

The following command sets a container offline from Port B, making it accessible only from Port A:

```
(config) # no container set name Strad201 port B online
```

The `show containers` command indicates that the status of the container is Single and displays the number and hostname of the Gateway for the online port. For example:

```
# show containers
Container          LUNs  Total   Free Ports HostnameA   HostnameB
Status
-----
-----
Strad201           1     10G    50G  A    MG-1      ---       Single
```

This chapter provides examples of client-side multipath setup for the HP VMA SAN Gateway. The following topics are covered:

- [Multipath Overview](#) on page 60
- [Multipath Setup](#) on page 61

Note: The examples in this chapter are guidelines for (client-side) Red Hat Enterprise Linux 5.x DM Multipath. For more information, go to the Red Hat Web site: http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/

Multipath Overview

Multipath I/O is commonly used when there is more than one physical path between the system CPU and the storage devices. The redundant paths are leveraged to increase performance and fault-tolerance.

Device Mapper Multipath (DM Multipath, Red Hat Enterprise Linux) is the multipathing utility used in the example presented in this chapter. DM Multipath is a generic framework that maps each physical path to a SCSI device represented as a separate `/dev` entry in a form of a block device. DM Multipath provides means of combining multiple such block devices into a single block device. DM Multipath uses Device Mapper kernel framework for mapping IOs between individual paths and user-space daemon `multipathd` for providing configuration and policy for the mapped device.

To determine which devices (and paths) correspond to a particular LUN, DM Multipath initiates a query. The response to the query returns the LUN serial number (among other information). The serial number for a LUN remains the

same, regardless of the number of paths that are associated with the LUN. Using the LUN serial number, DM Multipath can determine how many paths are associated with that particular LUN. The mechanism for getting a serial number is controlled by `getuid_callout` parameter, which is described in the next section.

Multipath Setup

This section covers setting up and configuring DM Multipath on the client side for use with HP VMA SAN Gateway provided LUNs.

Prerequisites

Before you begin setting up DM Multipath, do the following:

1. Verify that the `device-mapper-multipath` rpm is installed, as shown in the following example.

```
[root@redhat123 ~]# rpm -qa | grep multipath
device-mapper-multipath-0.4.7-23.el5_3.1
```

Note: The name of the package and the version shown may vary depending on your Linux distribution and version.

2. Make a copy of the original `multipath.conf` file. This ensures that you have the original file as backup, should an unexpected problem arise.

```
cp multipath.conf multipath.conf.bak
```

Note: The `multipath` package includes a file showing the default values that you can also use as a customization template, as well as a couple of other helpful files. Go to the `/usr/share/doc/device-mapper-multipath-0.4.7/` directory to access these files:

- `multipath.conf.defaults`
- `multipath.conf.annotated`
- `multipath.conf.synthetic`

Also see the man page for details on the available `multipath.conf` options.

```
man multipath.conf
```

Setting Up DM Multipath

This section shows you how to edit the `multipath.conf` file (the configuration file for `multipathd`) then configure the multipath daemon to start when the system boots up. DM Multipath default settings are suitable for common multipath configurations.

Setting up DM Multipath includes the following tasks:

1. [Editing the multipath.conf File](#) on page 62
2. [Configuring the Multipath Daemon](#) on page 64

Editing the multipath.conf File

This section presents the recommended configuration file for `multipathd` for use with a HP VMA SAN Gateway.

To edit the `multipath.conf` file, do the following:

1. Edit the `multipath.conf` file, uncommenting entries, similar to the following example. The `devnode_blacklist` includes devices for which you do not want multipathing enabled.

```
defaults {
    polling_interval 20
    max_fds          8192
    user_friendly_names yes
}

blacklist_exceptions {
    device {
        vendor "VIOLIN"
        product "SAN ARRAY"
    }
}

blacklist {
    device {
        vendor "*"
        product "*"
    }
}

devices {
    device {
        vendor          "VIOLIN"
        product         "SAN ARRAY"
        path_grouping_policy group_by_serial
        path_checker     tur
        # uncomment the corresponding getuid_callout for your OS
        # Ubuntu      getuid_callout
        # "/lib/udev/scsi_id -p 0x83 -g -u -s /block/%n"
        # RHEL5/OL5    getuid_callout
        # "/sbin/scsi_id -p 0x80 -g -u -s /block/%n"
        # RHEL6/OL6    getuid_callout
        # "/sbin/scsi_id --whitelisted --replace-whitespace --page=0x80 --device=/dev/%n"
        # SLES11       getuid_callout
        # "/lib/udev/scsi_id --page=0x83 --whitelisted --replace-whitespace --device=/dev/%n"

        path_selector    "round-robin 0"
        failback         immediate
        rr_weight         uniform
        no_path_retry     6
        # For RHEL6.2 or other newer kernels (see man multipath.conf),
        # change to rr_min_io_rq
        rr_min_io         4
        fast_io_fail_tmo 5
        dev_loss_tmo      30
    }
}
```

In the above example, support for Memory Array devices was added. When configuring this file, pay particular attention to the following:

- `path_grouping_policy` should be set to `group_by_serial`
- `getuid_callout` should be set
- `path_checker` should be `tur (TEST_UNIT_READY)`
- `failback` should be `immediate`
- `rr_weight` should be uniform since weights are not assigned to the individual paths
- `no_path_retry` should be set to immediately bring path back online
- `rr_min_io` should be set to 4, but can be subject to change depending on the environment and workload.

2. Save the `multipath.conf` file and proceed with [Configuring the Multipath Daemon](#).

Configuring the Multipath Daemon

This section demonstrates how to configure the multipath daemon (`multipathd`) so that it starts when the system boots up.

To configure the multipath daemon, do the following:

1. Use the `chkconfig` command to add (`-a`) the multipath daemon (`multipathd`) as a service.
2. Restart the multipath service, using the `service restart` command.
3. Verify that the multipath service is running, using the `multipath -ll` command.

The following example demonstrates these steps for a single LUN that is accessible through two Fibre Channel (FC) ports that are multipathed into a single multipath device (`/dev/mapper/mpath1`).

```
# chkconfig -a multipathd
# service multipathd restart
# multipath -ll
mpath176 (36001b97074dc2dff74dc2dfe97c7089e) dm-0 VIOLIN, ARRAY
[size=1.0G][features=0][hwhandler=0][rw]
\_ round-robin 0 [prio=0][active]
  \_ 5:0:2:1 sdl 8:176 [active][ready]
  \_ 5:0:3:1 sdm 8:192 [active][ready]
mpath11 (36001b97074dc2dff74dc2df6ecc00a) dm-1 VIOLIN, ARRAY
[size=1.0G][features=0][hwhandler=0][rw]
\_ round-robin 0 [prio=0][active]
  \_ 5:0:2:2 sdx 65:112 [active][ready]
  \_ 5:0:3:2 sdy 65:128 [active][ready]
```

This appendix contains the system specifications for the HP VMA Array and HP VMA Array.

HP VMA SAN Gateway Specifications

Review the following table to plan for a deployment that meets the requirements of your site.

3000 Series Model	Violin Memory 3205	Violin Memory 3210
Flash Type	SLC	SLC
Raw Capacity (GiB/GB)	5.3TB/5.7TB	10.7TB/ 11.5TB
VIMM Count (Data + Hot Spare)	40+2	40+2
Reliability / Resiliency	System Level Hardware Based vRAID VIMM level Hot-Swap Redundant power supply and fans Active/Active external memory gateways	
Connectivity Options	1x PCIe Gen1 x8, or 2x PCIe Gen1 x4 With external memory gateways: 8x 8/4Gb/s Fibre Channel 8x 10GbE iSCSI	

3000 Series Model	Violin Memory 3205	Violin Memory 3210
3000 Array Enclosure Dimensions:		
Height:	3RU	
Width:	16.9" / 430mm	
Depth:	28.4" / 721mm	
Cable Management:	7" / 178mm	
Maximum Weight:	76lbs / 34.5kg	
3000 Array Enclosure Power	800W	800W
3000 Array Enclosure Cooling	3860 BTU/hr	3860 BTU/hr
Memory Gateway Dimensions:		
Height:	2RU	
Width:	17.2" / 437mm	
Depth:	25.5" / 648mm	
Maximum Weight:	50lbs / 22.7kg	
Memory Gateway Power	500W	
Client Operating Systems Support	PCIe: RHEL, SLES, Windows With external memory gateways: RHEL, SLES, Windows, HPUX	
Management	CLI: Serial, Telnet, SSH / SNMP / Web GUI / REST XML API / iPad	

3000 Series Model	Violin Memory 3205	Violin Memory 3210
Environmentals	Inlet Temp: 0C to 35C Humidity: 5-95% (non condensing) Altitude: 10,000 feet (Derate temperature)	
Regulatory	Safety: IEC/EN 60950, CB Certificate, UL60950-1 CAN/ CSA-C22.2 No.60950-1, CE Mark Emissions Class A: EN55022/ CISPR 22, FCC Part 15 Class A, ICES-003 Issue 4 Class A, VCCI Class A, AS/NZS CISPR22:2006 Class A, BSMI CNS 13438 Class A, Korea RRA Notice No. 2011-18 Class A Immunity: EN55024, EN 61000-4-2,3,4,5,6,8,11, Korea RRA Notice No. 2011-17	

This appendix contains the following compliance information for the HP VMA SAN Gateway.

- [Security & Compliance](#) on page 69
- [Regulatory Model Number](#) on page 70
- [Advised General Precautions](#) on page 70
- [Installation Conditions and Precautions](#) on page 70
- [Electrostatic Discharge \(ESD\) Precautions](#) on page 71
- [Lithium Battery Caution](#) on page 72
- [Cabinet Safety Precautions](#) on page 72
- [Disposal of Waste Equipment by Users in Private Households in the European Union](#) on page 72
- [Perchlorate Material - Special Handling May Apply](#) on page 73
- [European Union RFI Statement](#) on page 73
- [USA Radio Frequency Interference FCC Notice](#) on page 73
- [Japan Radio Frequency Interference VCCI](#) on page 73
- [Korea RFI Statement](#) on page 73
- [Canada RFI Statement](#) on page 74
- [Australia C-Tick Label](#) on page 74
- [Taiwan BSMI Statement](#) on page 74

Security & Compliance

HP cannot be responsible for unauthorized use of equipment and will not make allowance or credit for unauthorized use or access.

Compliance Information

Notice	Description
FCC Class A Compliance	"This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation." This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, you are required to correct the interference at your own expense.
Canada	This class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
CISPR22	Warning: This is a class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate remedial measures.
Japan	VCCI 準拠クラスA機器（日本） この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Table Preface.1 Compliance Information

Regulatory Information

For your protection, this product has been tested for conformance to various national and international regulations and standards. The scope of this regulatory testing includes electrical and mechanical safety, electromagnetic emissions, immunity, acoustics and hazardous materials.

Regulatory Model Number

For the purpose of regulatory compliance certifications and identification, this product is assigned a regulatory model number. This number can be found on the product label, along with the required approval markings and information. When requesting certification information for this product, always refer to this regulatory model number.

Note: Do not confuse the regulatory model number with the marketing or model number.

Advised General Precautions

This section covers a list of highly recommended general precautions:

- Keep the area around the installation clean and free of clutter.
- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, that can come in contact with electrical circuits or accidentally be pulled into a cooling fan.
- Remove any jewelry or metal objects from your body before you begin working on a system. Metal is an excellent conductor and these objects could create short circuits and cause bodily harm.

Installation Conditions and Precautions

See the installation instructions for your system before connecting this equipment to the input supply.

WARNING! The equipment must be provided with a proper AC protective earth (PE) ground connection.

- Know the locations of the power on/off switch on the chassis, as well as the emergency power-off switch, disconnection switch, or electrical outlet in the room in which the system is installed. Should an electrical accident occur, this ensures that you can quickly shut off the power to the system.
- Do not work alone when performing procedures that involve high voltage components.
- Always disconnect the power to a system before removing or installing system components. Before you disconnect the power, first power down the (operating) system and then unplug power cords for all power supply modules.

-
- The power supply power chord must include a grounding plug and must be plugged into grounded circuit outlets.
 - Use only one hand when working with powered-on electrical equipment. This helps to avoid creating a complete circuit, thus preventing electrical shock.

WARNING! There is a danger of explosion if the onboard battery is installed upside down, as a result of reversed polarities. This battery must be replaced only with the same type of battery, or an equivalent type recommended by the manufacturer.

- Be careful when handling batteries. Do not damage the battery in any way, as it may then release hazardous materials into the environment. Comply with the regulations established by your local hazardous waste management agency and dispose of used batteries in accordance with their rules.

Network Connected Equipment

WARNING! The installation must provide a ground connection for the network equipment.

Electrostatic Discharge (ESD) Precautions

When handling any electronic component or assembly, you must observe the following antistatic precautions to prevent damage. An ESD kit (P/N A3024-80004) is available (or supplied with memory additions). This kit contains one wrist strap, one conductive sheet, and one antistatic foam pad.

- Always disconnect power from the server and wear a grounded wrist strap when working around the server.
- Always wear a grounded wrist strap when handling printed circuit boards.
- Keep all components in their antistatic bags until ready to use. Return components back inside their antistatic bags when not in use.
- Touch a grounded metal object before removing a component from its antistatic bag.
- Do not let components come in contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Treat all assemblies, components and interface connections as static-sensitive.
- Do not use mats designed to decrease electrostatic discharge as a protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- Avoid working in carpeted areas, and keep body movement to a minimum while removing or installing boards, to minimize buildup of static charge.
- Use extreme caution when using metal tools, which can damage electrical components or circuit boards they come in contact with.

Lithium Battery Caution

WARNING! Observe the correct polarity when changing the lithium battery. There is a danger of explosion if battery is installed incorrectly.

Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and local disposal requirements.

Note: Switzerland: Annex 4.10 of SR 814.013 applies to batteries.

Cabinet Safety Precautions

WARNING! Cabinets are heavy even when empty. Exercise caution when moving cabinets whether equipment is installed in the cabinet or not. Avoid rolling cabinets on rough or uneven surfaces or inclines greater than 10 degrees. Unloading cabinets from the pallet and movement of cabinets should be performed by at least two people.

Slidable products are not to be extended from the cabinet while the equipment is on the shipping pallet. The cabinet must be unloaded from the pallet and all anti-tip devices properly installed prior to extending any slidable product.

Once installed, all anti-tip devices must remain in place to maintain stability. Only one slidable product must be extended at a time.

Failure to follow these precautions can result in damage to equipment or injury to personnel.

Disposal of Waste Equipment by Users in Private Households in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment.



The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Perchlorate Material - Special Handling May Apply

See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate>.

This product may include a real-time clock battery or coin cell battery that may contain perchlorate and may require special handling when recycled or disposed of in California. Refer to the product user documentation to determine if this product contains batteries, and if so, the battery type(s) that are used.

European Union RFI Statement

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

USA Radio Frequency Interference FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes or modifications not expressly approved by HP

could result in the equipment being noncompliant with FCC Class A requirements and void the user's authority to operate the equipment.

Japan Radio Frequency Interference VCCI

VCCI 準拠クラスA機器（日本）

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Korea RFI Statement

A급 기기 이 기기는 업무용으로 전자파 적합 등록을 한 기기이
오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약
잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Canada RFI Statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia C-Tick Label



Figure B.1 Australian C-Tick Label

Taiwan BSMI Statement

警告使用者:

這是 a 類資訊產品, 在居住環境中使用時,
它可能會導致無線電頻率干擾, 在這種情況下,
使用者可能需要採取適當的對策

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